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Overview of regulatory T cells in transplantation

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Overview of Regulatory T Cells in Transplantation Jaeseok Yang *Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea.* Current immunosuppression has limitations in both efficacy and safety. It is not effective enough to suppress chronic rejection. Moreover, it fails to induce tolerance and therefore its continuous use induce toxic complications including malignancy and infection due to its long-term nonspecific immunosuppression. Immunosuppressive cell therapy is one of efforts to overcome these limitations of the current immunosuppressants. Among various immunosuppressive cell therapy, regulatory T cells (Tregs) are the most promising candidate for clinical application. Tregs can contribute to tolerance induction or minimization of toxic immunosuppressants through donor-specific immunosuppression, linked suppression, and infectious tolerance. Therefore, ONE study, a multinational phase 1 safety trial, was successfully completed and many efficacy trials using conventional antigen-specific or polyclonal Tregs have been ongoing. However, there are also several limitations to clinical application of Treg therapy, such as low number of Tregs, especially that of antigen-specific Tregs for cell therapy, functional plasticity, low capability of survival and proliferation after transfer, and practical difficulty of autologous Treg generation. To overcome these limitations, engineered Treg therapy including chimeric antigen receptor Tregs, T cell receptor Tregs, B cell antibody receptor Tregs, are recently emerging. New engineered Treg therapy is expected to contribute to more effective and safe immune modulation in organ transplantation.